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PUBLICATIONS

OF THE

Astronomical Society of the Pacific.

VOL. XIX. SAN FRANCISCO, CALIFORNIA, DECEMBER 10, 1907. No. 117.

PLANETARY PHENOMENA FOR JANUARY AND FEBRUARY, 1908.

BY MALCOLM McNEILL.

PHASES OF THE MOON, PACIFIC TIME.

New Moon.....	Jan. 3, 1 ^h 43 ^m P.M.	New Moon....	Feb. 2, 12 ^h 36 ^m A.M.
First Quarter...	" 10, 5 53 A.M.	First Quarter...	" 8, 8 27 P.M.
Full Moon.....	" 18, 5 37 A.M.	Full Moon.....	" 17, 1 5 A.M.
Last Quarter....	" 26, 7 1 A.M.	Last Quarter...	" 24, 7 24 P.M.

The first of the three solar eclipses of the year will occur on January 3d. It will be a total eclipse, the line of totality running through the Pacific Ocean from a point north of Australia to the east coast of Central America. It will be seen as a partial eclipse from points in the central and southern parts of the United States late in the afternoon. The path of totality is mainly over the open ocean, but it crosses several of the small islands in the South Pacific, which afford fairly good observing stations. Some of these will be made use of by observing parties from the Lick and other observatories. The maximum duration of totality is a little more than four minutes; this is rather more than the average duration. One circumstance is perhaps worth noting. As the line of the eclipse track crosses the line "where the day begins," the local time of beginning is sunrise of January 4th, and the local time of ending is sunset on January 3d.

The Earth is in perihelion on the morning of January 2d.

Mercury is a morning star at the beginning of the year, too near the Sun for naked-eye observations, as it rises only half an hour before sunrise. It passes superior conjunction on the evening of January 13th, reaches greatest east elongation on February 13th, and comes to inferior conjunction on February

28th. At the time of greatest elongation it remains above the horizon rather more than an hour and a half after sunset, and it will be an easy object for naked-eye view on a clear evening during the late twilight. The interval between the setting of the Sun and of the planet is more than an hour during the period from two weeks before to about one week after the date of greatest elongation. The duration of visibility and maximum elongation from the Sun are both much less than the average for winter east elongations, for the reason that the planet passes its perihelion less than a day after the time of greatest elongation. There will be a much better opportunity for seeing the planet in June.

Venus is an evening star, gradually increasing its distance from the Sun from 29° , on January 1st, to 36° , on February 29th. On the first-named date it sets a trifle more than two hours after sunset, and this interval increases to more than three hours by the end of February. On the evening of February 13th it will be within one degree of the point in the sky known as the vernal equinox. It passes *Saturn* about noon on February 10th, a little more than one degree, or two apparent diameters of the Moon, north of the latter.

Mars will not be in good position for observation throughout the year on account of its distance from us and consequent faintness, although it will not be difficult to see it except for a month or two about the middle of the year, while it is near conjunction with the Sun. On January 1st it is an evening star, and remains above the horizon until nearly 11 o'clock, and by the end of February it sets a little before 10^h 30^m. During the two-months period it moves about 38° eastward and 17° northward through the constellation *Pisces* into *Aries*, passing a little north of the vernal equinox on January 10th. On January 1st its distance from the Sun will be 127 millions of miles. This is more than three times as great as the distance at the time of opposition in July, 1907, and its brightness will be not one tenth as great as it was then; but it will still be as bright as all but the brightest stars, and there is no star as bright in near proximity to the planet, although it is quite close to *Saturn* on January 1st. So there will be no difficulty in identifying it. Its distance from the Earth is increasing rapidly, and it will lose more than half its brightness by the end of February.

Jupiter is in fine position for observation, as it comes to opposition with the Sun on January 29th. It will then be above the horizon throughout the whole night, and during the whole two-months period it will be in sight whenever the twilight is sufficiently dark to show it. It is in the constellation *Cancer*, not very near any bright star, and retrogrades, moves westward, about 10° , and 2° northward by February 29th.

Saturn is an evening star, setting a little after $10^{\text{h}} 30^{\text{m}}$ on January 1st, and a little after 7^{h} on February 29th. At the beginning of January it is near *Mars*, about 2° south, but its slower motion among the stars makes the distance between the planets increase rapidly, and by the end of February it is more than 30° . The very interesting series of appearances and disappearances of the rings which has been going on during 1907 ceases early in January. On January 1st the Earth and Sun are on opposite sides of the plane of the rings, but in a few days the Earth passes to the other side of the plane, and for the following fourteen or fifteen years Earth and Sun will both be on the southern side. For some months the rings will present the appearance of a very narrow streak, but in the summer of 1908 the apparent minor axis will be about one eighth of the major.

Uranus is in conjunction with the Sun on January 4th and becomes a morning star, but does not get far enough away for visibility until after the end of the period. It is so faint—just within the limit of naked-eye visibility—that it cannot be seen without a telescope at a much lower altitude than 25° .

Neptune is in opposition with the Sun on January 4th, and is therefore above the horizon throughout the whole night at that time, but it is too faint for naked-eye observation. It is in the constellation *Gemini*.
